.
Manimangalam, . .

DEPARTMENT OF
CIVIL ENGINEERING

CE 6512- SURVEY CAMP

V SEMESTER - R 2013

LABORATORY MANUAL

Name :

Register No. :

Class :

VISION

. is committed to provide highly disciplined, conscientious and enterprising professionals conforming to global standards through value based quality education and training.

MISSION

- To provide competent technical manpower capable of meeting requirements of the industry
- To contribute to the promotion of Academic Excellence in pursuit of Technical Education at different levels
- To train the students to sell his brawn and brain to the highest bidder but to never put a price tag on heart and soul

DEPARTMENT OF CIVIL ENGINEERING

VISION

To impart professional education integrated with human values to the younger generation, so as to shape them as proficient and dedicated engineers, capable of providing comprehensive solutions to the challenges in deploying technology for the service of humanity

MISSION

- To educate the students with the state-of-art technologies to meet the growing challenges of the civil industry
- To carry out research through continuous interaction with research institutes and industry, on advances in structural systems
- To provide the students with strong ground rules to facilitate them for systematic learning, innovation and ethical practice.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. FUNDAMENTALS

To provide students with a solid foundation in Mathematics, Science and fundamentals of engineering, enabling them to apply, to find solutions for engineering problems and use this knowledge to acquire higher education

2. CORE COMPETENCE

To train the students in Civil Engineering technologies so that they apply their knowledge and training to compare, and to analyze various engineering industrial problems to find solutions

3. BREADTH

To provide relevant training and experience to bridge the gap between theories and practice this enables them to find solutions for the real time problems in industry, and to design products

4. PROFESSIONALISM

To inculcate professional and effective communication skills, leadership qualities and team spirit in the students to make them multi-faceted personalities and develop their ability to relate engineering issues to broader social context

5. LIFELONG LEARNING/ETHICS

To demonstrate and practice ethical and professional responsibilities in the industry and society in the large, through commitment and lifelong learning needed for successful professional career

PROGRAMME OUTCOMES (POs)

a) To demonstrate and apply knowledge of Mathematics, Science and engineering fundamentals in Civil Engineering field

b) To design a component, a system or a process to meet the specific needs within the realistic constraints such as economics, environment, ethics, health, safety and manufacturability

c) To demonstrate the competency to use software tools for analysis and design of structures

d) To identify, constructional errors and solve Civil Engineering problems

e) To demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks

f) To function as a member or a leader in multidisciplinary activities

g) To communicate in verbal and written form with fellow engineers and society at large

h) To understand the impact of Civil Engineering in the society and demonstrate awareness of contemporary issues and commitment to give solutions exhibiting social responsibility

i) To demonstrate professional & ethical responsibilities

j) To exhibit confidence in self-education and ability for lifelong learning

k) To participate and succeed in competitive exams

CE 6512 – SURVEY CAMP

SYLLABUS

COURSE OBJECTIVES

1. To acquire practical knowledge on handling basic chain survey equipments
2. To possess knowledge about compass surveying
3. To have the ability to prepare leveling table
4. To possess knowledge about contour map

LIST OF EXPERIMENTS

1. Determination of area by triangulation method
2. Determination of area by trilateration method
3. Grid contouring
4. Radial contouring
5. Check leveling
6. Leveling – CS and LS
7. Plane table surveying radiation method
8. Area calculation by using total station.

COURSE OUTCOMES

1. Students completing this course would have acquired practical knowledge on handling survey instruments like chain, compass and have adequate knowledge to carryout Triangulation and area calculation including general field marking for various engineering projects and curves setting.
2. Students completing this course would have acquired practical knowledge on handling survey instruments like Theodolite, Tacheometery and Total station and have adequate knowledge to carryout Triangulation and Astronomical surveying .

CONTENTS

Expt. No. 01 DETERMINATION OF AREA BY TRIANGULATION

Aim:

To determine the area of the given plot using the method of triangulation

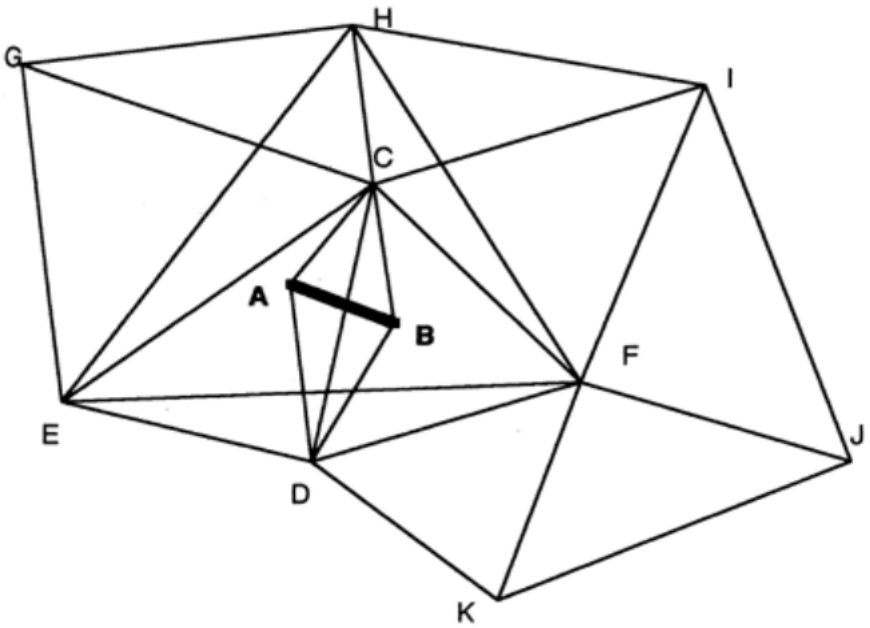
Instruments required:

1. Theodolite with tripod stand
2. Ranging rod
3. Tape
4. Arrow

Theory:

Triangulation is the process of establishing horizontal control in the surveying. The triangulation system consists of number of inter connected triangles in which the length of the base line and the triangle are measured very precisely.

Diagram:



Procedure:

1. Select the base line and mark as P and Q at 25m distance apart.
2. Select the other station points namely A,B,C,D around the base line PQ
3. Fix the ranging rods at each point and now the instrument is placed over the station P and all other adjustments are made.
4. Then from P the ranging rod at the station Q is sighted and angles were noted keeping the instrument.
5. At face left similarly from station P sight all the other points and the angles were measured. After that the angles were noted by changing the face of the instrument to face right.
6. Shift the instrument to station Q and the initial adjustments are done.
7. Repeat the same procedure carried out at the station P and the angles were recorded.
8. From P the ranging rod at the station Q is sighted and angles were noted keeping the instrument.
9. At face left similarly from station P sight all the other points and the angles were measured. After that the angles were noted by changing the face of the instrument to face right.
10. Calculate the interior angles and drawings are drawn. Area are calculated using the formula

Formulae:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

For calculating the sides of a triangle,

$AB^2 = AC^2 + BC^2 - 2*AC*BC*\cos\theta$

θ is the angle between ACB

Area:

$A=\sqrt{s\,(s-a)(s-b)(s-c)}$

$s = \frac{(a+b+c)}{2}$,

Where,

a, b and c are sides of a triangle

Observation:

Instrument sight	Sight to	Face left swing right								Face right swing left								Total mean		
		A			B		mean			A			B		mean					
		*	'	"	"	'	"	*	'	"	*	'	"	*	'	"	*	*	'	"
S1	A																			
	B																			
	S2																			
	G																			
	H																			

Calculation:

In Triangle S_1S_2B:

$$\frac{a}{\sin\theta 1} = \frac{BS2}{\sin\theta 2} = \frac{SB1}{\sin\theta 3}$$

BS2 = m

Sb1 = m

$s = \frac{(a+b+c)}{2} = m$ A= $\sqrt{s(s-a)(s-b)(s-c)}$ = m²

In Triangle S_2S_3C:

$$\frac{a}{\sin\theta 1} = \frac{CS2}{\sin\theta 3} = \frac{CS3}{\sin\theta 2}$$

CS2 = 80.23m

CS3 = m

$s = \frac{(a+b+c)}{2} = m$

A= $\sqrt{s(s-a)(s-b)(s-c)}$ = m²

In Triangle S_1S_2G:

$$\frac{a}{\sin\theta 1} = \frac{GS1}{\sin\theta 3} = \frac{GS2}{\sin\theta 2}$$

GS1 = m

GS2 = m

$s = \frac{(a+b+c)}{2} = m$

A= $\sqrt{s(s-a)(s-b)(s-c)}$ = m²

In Triangle S_2S_3F:

$$\frac{a}{\sin\theta 1} = \frac{FS2}{\sin\theta 2} = \frac{FS3}{\sin\theta 3}$$

FS2 = m

FS3 = m

s = $\frac{(a+b+c)}{2}$ = m

A = $\sqrt{s(s-a)(s-b)(s-c)}$ = m^2

In Triangle BS_2C:

$BC^2 = BS_2^2 + CS_2^2 - 2*BS_2 * CS_2$ COS

BC^2 =

s = $\frac{(a+b+c)}{2}$ = m

A = $\sqrt{s(s-a)(s-b)(s-c)}$ = m^2

In Triangle S_2GF:

$GF^2 = FS_2^2 + GS_2^2 - 2*FS_2 * CS_2\cos\theta$

GF^2 =

s = $\frac{(a+b+c)}{2}$ = m

A = $\sqrt{s(s-a)(s-b)(s-c)}$ =

In Triangle S_1GH:

$GH^2 = HS_1^2 + GS_1^2 - 2*HS_1 * GS_1\cos\theta$

GH^2 =

s = $\frac{(a+b+c)}{2}$ = m

A = $\sqrt{s(s-a)(s-b)(s-c)}$ = m^2

In Triangle S_1AB:

$AB^2 = AS_1^2 + BS_1^2 - 2*AS_1 * BS_1\cos\theta$

AB^2 =

s = $\frac{(a+b+c)}{2}$ = m

A = $\sqrt{s(s-a)(s-b)(s-c)}$ = m^2

In Triangle S_1AH:

S_1= 30m

HS_1= 52.5m

s = $\frac{(a+b+c)}{2}$ = m

A=$\sqrt{s(s-a)(s-b)(s-c)}$ = m^2

TOTAL AREA = 1+2+3+4+5+6+7+8+9 (TRIANGLE VALUE)

TOTAL AREA = m^2

Result:

The area of the given plot = m^2

Outcome:

Gain the ability to calculate area in wide field

Viva - voce

1. What is surveying?
2. What are the types of surveying? What are the primary divisions of surveying?
3. What are the types of ranging?
4. What is meant by tie stations
5. What are check lines?
6. What are the uses of contours?
7. What is different between fore bearing and back bearing?
8. What is meant by well-conditioned triangle?
9. How will you test a chain?
10. Differentiate metric chain from engineer's chains.
11. What is meant by reconnaissance survey?
12. What is representative fraction?
13. What is meant by scale of plan?
14. What is a well conditional triangle?
15. What do you mean by scale in surveying?

Expt. No. 02 DETERMINATION OF AREA (TRILATERATION)

Aim:

To determine the distance between the given station points using the method of trilateration and area enclosed by the station points

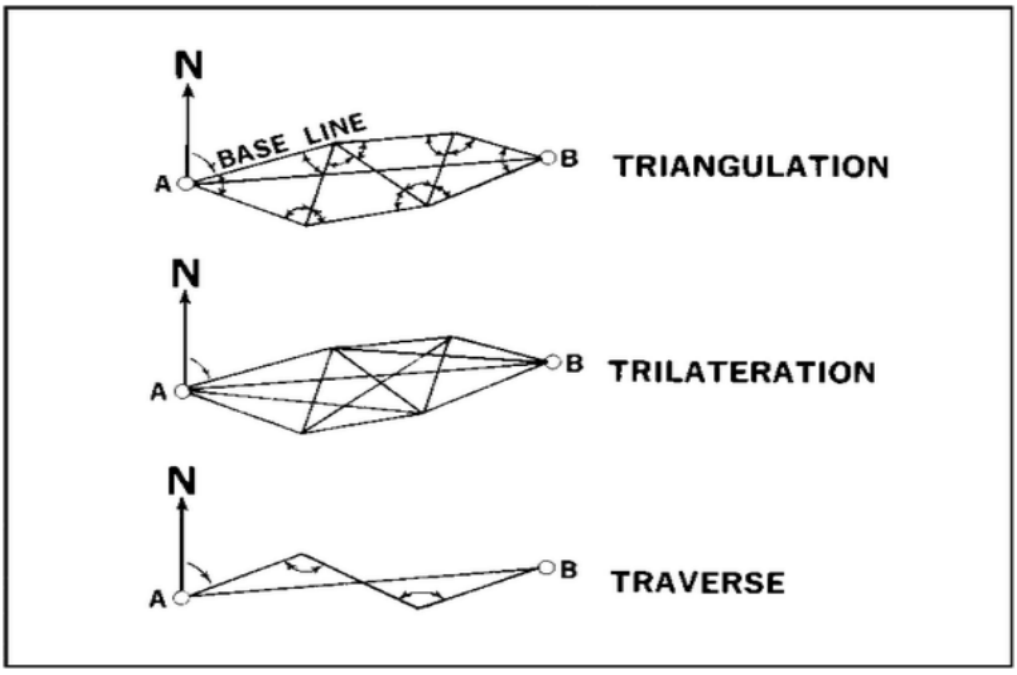
Instruments required:

1. Theodolite
2. Ranging rod
3. Leveling staff
4. Cross staff
5. Arrows
6. Pegs

Theory:

Trilateration is the method of calculating the distance between the station points by running a closed traverse

Diagram:



Procedure:

1. Mark the given points A, B, C, D, E by using peg or arrows in such a way that it is possible to see those points from any point
2. Place the instrument in such a way that it is centre to all the points and also visible from the selected points.
3. The initial adjustment are done for accuracy in the survey
4. Then the point A is forced and then the vertical angle and the top, middle and top hair readings are taken by placing the leveling staff at point A.
5. Take the vertical and the top, middle and the top hair reading for all the given points.
6. Then the instrument is set any point and the distance and the vertical angle between the adjacent points are taken.
7. Thus we get a polygon whose sides are known or multiple triangle whose sides are drawn
8. By using the given dimensions and by using the triangle formulas the area can be calculated

Formula used:

Horizontal distance

$D = KS\cos^2\theta + C\cos\theta$

K = multiple constants =100

C= additive constants = 0

S = staff intercept (top hair – bottom hair)

Area Of The Triangle:

$A=\sqrt{s(s-a)(s-b)(s-c)}$

$s=\frac{(a+b+c)}{2}$,

Where,

a, b and c are sides of a triangle

Observation:

Horizontal distance = $KS\cos^2\theta + C\cos\theta$

Where C=0

$OA = KS\cos^2\theta + C\cos\theta$

STATION PT	SIGHT TO	STADIA HAIR READING	VERTICAL POINT	VERTICAL ANGLE
		TOP	MIDDLE	BOTTOM
O	A			
	B			
	C			
	D			
	E			
	F			
A	B			
	F			
E	D			
	F			
C	D			
	B			

Calculation:

$OC = KS\ COS^2\theta + C\ COS\theta$

OC=

$OD = KS\ COS^2\theta + C\ COS\theta$

OD=

$OE = KS\ COS^2\theta + C\ COS\theta$

OE=

$OF = KS\ COS^2\theta + C\ COS\theta$

OF=

$AB = KS\ COS^2\theta + C\ COS\theta$

$AF = KS\ COS^2\theta + C\ COS\theta$

AF=

$ED = KS\ COS^2\theta + C\ COS\theta$

ED=

$EF = KS\ COS^2\theta + C\ COS\theta$

EF =

CD = KS $COS^2\theta$ + C $COS\theta$

CD=

CB = KS $COS^2\theta$ + C $COS\theta$

CB=

To find the area:

In Triangle AOB:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

= $\frac{(a+b+c)}{2}$ =

In Triangle BOC:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

s =$\frac{(a+b+c)}{2}$ =

In Triangle COD:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

s =$\frac{(a+b+c)}{2}$=

In Triangle DOE:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

s =$\frac{(a+b+c)}{2}$ =

In Triangle EOF:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

s =$\frac{(a+b+c)}{2}$ =

In Triangle AOF:

A=$\sqrt{s(s-a)(s-b)(s-c)}$ =

s =$\frac{(a+b+c)}{2}$ =

TOATAL AREA = $A_1 + A_2 + A_3 + A_4 + A_5 + A_6$

A =

Result:

The area of the given plot is = m^2

Outcome:

Gain the ability to calculate area in wide field

Viva-voce

1. What are optical square?
2. What are the well-conditioned and ill conditioned triangles?
3. Mention different types of compasses?
4. What is meant by ranging
5. What is theodolite?
6. What is change point?
7. What is profile levelling?
8. What are the major parts of a theodolite?
9. What do you mean by latitude and departure in a theodolite traversing?
10. What is mean by parallax?
11. Name the temporary adjustments in a transit.
12. Define the term “transiting of telescope”.
13. What are the various methods of balancing a traverse?
14. State the location and function of a plate bubble in a theodolite.
15. What are latitude and departure? What are their sign conventions?

Expt. No. 03 GRID CONTOURING

Aim:

To draw the contour map for the given area

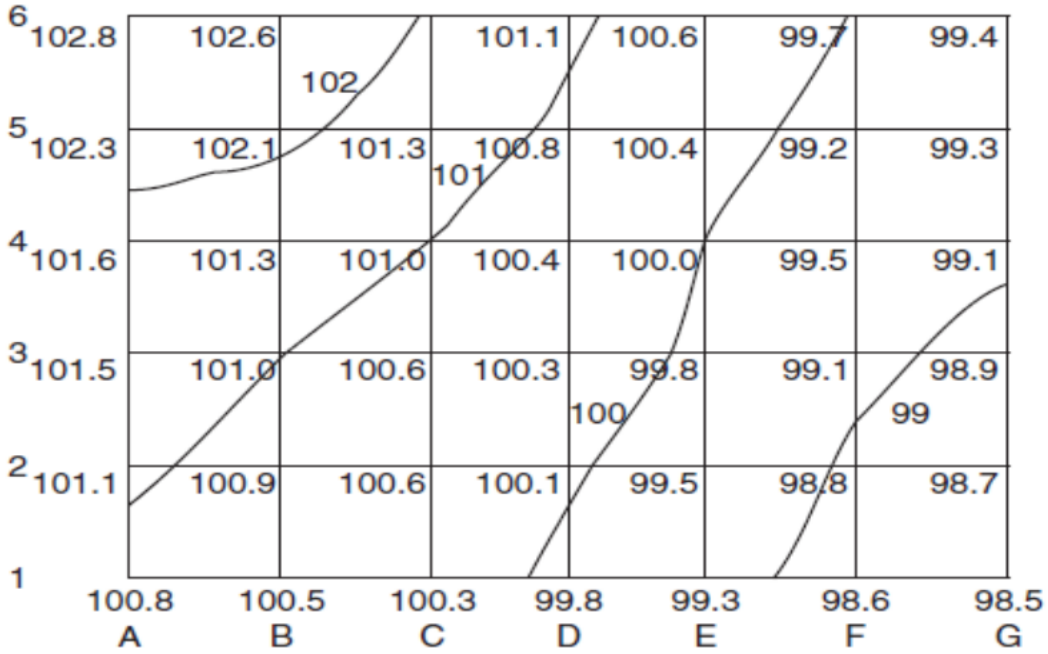
Instruments required:

1. Theodolite with tripod stand
2. Ranging rod
3. Leveling staff
4. Arrows
5. Cross staff
6. Tape or chain

Theory:

A map without relief representation is simply a plan on which relative positions of details are only shown in horizontal phase. Relative heights of various points on the map may be represented by one of the methods of contour

Diagram:



Procedure:

1. The site for block contouring is selected by through study. The dimension of block counter size is selected accordingly.
2. Then the area is divided into blocks of the size 3m*3m by using cross staff, chain and ranging rod.
3. The instrument is placed in such a place where maximum reading can be taken on the intersection points
4. Change points are provided wherever needed. After taking the readings, the RL of each point is calculated by height of collimation method or by rise and fall method.
5. All reduced levels are plotted in A2 drawing sheet of suitable scale.

Observation:

STATION	X	Y	B.S	I.S	F.S	H.I	R.L	REMARKS
0,0	0	0						
5,0	5	0						
10,0	10	0						
15,0	15	0						
20,0	20	0						
25,0	25	0						
30,0	30	0						
0,5	0	5						
5,5	5	5						
10,5	10	5						
15,5	15	5						
20,5	20	5						
25,5	25	5						
30,5	30	5						
0,10	0	10						
5,10	5	10						
10,10	10	10						
15,10	15	10						

20,10	20	10						
25,10	25	10						
30,10	30	10						
0,15	0	15						
5,15	5	15						
10,15	10	15						

Result:

The block size of 3m*3m was drawn and reduced level at each intersection was entered. Smooth curves of various lines were drawn connecting points of equal elevation and the contour map was prepared.

Outcome

Gain knowledge about drawing and plotting of contour maps

Viva- voce

1. What is surveyor chain?
2. What are the types of bearing and meridian
3. What are errors in chaining?
4. What are errors in chaining?
5. What are the different types of chain?
6. What is dip?
7. How can you eliminate the dip?
8. What are thedifferent types of bench marks.
9. What is “Contour interval” and “horizontal equivalent”?
10. What is profile leveling? State its application.
11. Why the necessity of making, balancing of backsights and foresights.
12. What are the various methods of booking a reduced level?
13. What is meant by the term contour gradient?
14. What are the different types of leveling staves?
15. What is horizontal equivalent? Why is it constant?

Expt. No: 04 RADIAL CONTOURING

Aim:

To prepare contour map for the given area.

Instruments required:

1. Theodolite
2. Ranging rod
3. Chains
4. Arrows
5. Pegs

Diagram:

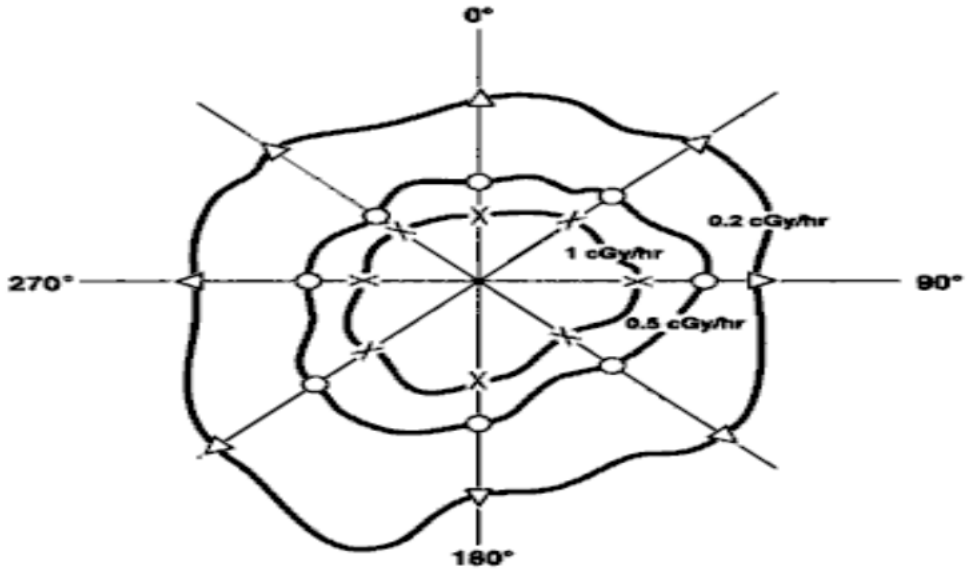


Figure A-II. Radial Plot

Theory:

This method is suitable for countering the area of long strip undulations where direct chaining is difficult.

Procedure:

1. Range out the radial line from a common centre at known angular interval.
2. Fix arrows on the radial lines at equal distances of 3m or 5m.
3. Set up the instrument at any convenient place to cover the maximum points.

4. Hold the leveling staff in the place of arrows.
5. Note down the vertical angels and the hair readings and enter it correctly.
6. Repeat the same procedure for other radial lines.
7. Similarly shift the instrument s tat ion to other convenient place and c over the entire

Formulae:

Reduced level of the instrument = Bench mark + staff reading on bench mark – Height

Horizontal distance=D=KS $\cos^2 \theta$ +cos θ

S - Staff intercepts

Vertical distance = D tan θ

Observation:

Instrument AT	Bearing in Degree	Sight To	Horisontal Distance	B.S	I.S	F.S	H.I	R.L	Remarks
O	0							100	B.M
	30°								
	60°								
	90°								
	120°								

Result:

The block size of 3mx3m was drawn and reduced level at each intersection was entered. Smooth curves of various lines were drawn connecting point of equal elevation and the contour map was prepared.

Outcome:

Gain knowledge about drawing and plotting of contour maps.

Viva- voce

1. What is local attraction?
2. How local attraction can be detected?
3. What are the types of traverse?
4. What is meant by variation of declinations
5. What is different between magnetic bearing and true bearing?
6. What are the objects of preparing a contour map?
7. What is meant by contour gradient? Where it is used?
8. In some, contour lines are closer. In some, they are wide for the same contour interval. What does it mean?
9. Why the horizontal equivalent is not constant?
10. How to calculate earthwork using contours?
11. How will you differentiate a summit from a depression by studying the nature of the contour?
12. What is meant by Contour Line?
13. What is Contour Interval?
14. What is meant by Horizontal Equivalent?
15. What are the different types of Bench marks?

Expt. No.05 CHECK LEVELLING

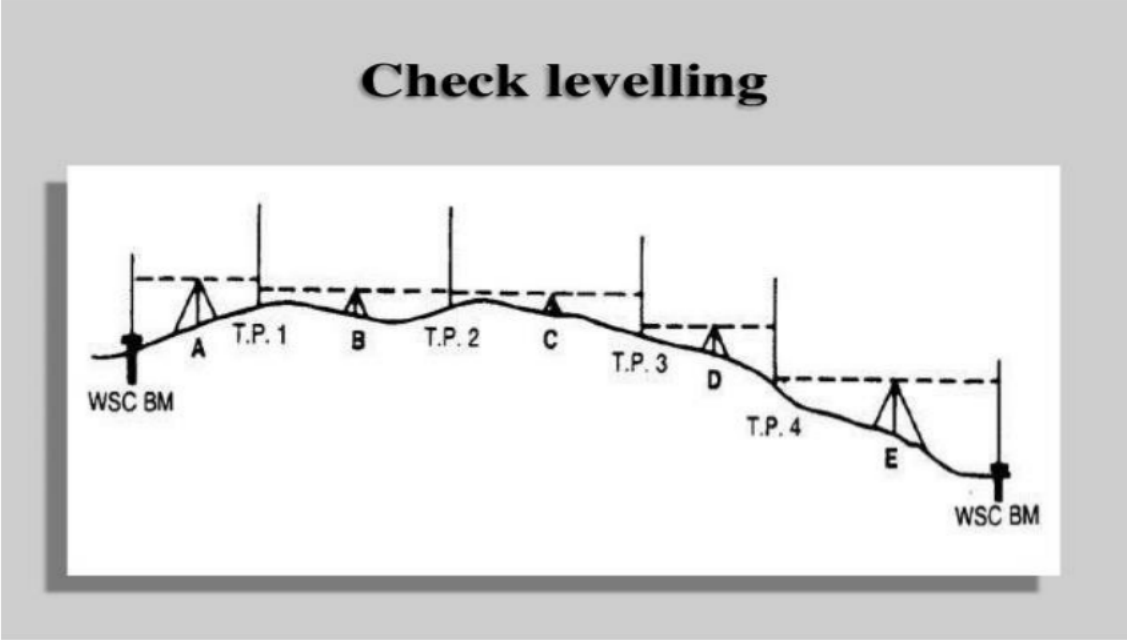
Aim:

To run the check level to find the level difference of the given points

Apparatus required:

1. Dumpy level
2. Tripod
3. Staff

Diagram:



Procedure:

1. Set up the instrument at P to cover the maximum points
2. Do all the initial adjustments
3. Direct the telescope towards the first point and enter the reading as B.S.
4. Enter the reading of the last visible point from the instrument station as F.S. and of all other point as I.S.
5. Shift the instrument to Q, set up and level it correctly.
6. Don't change the position of the staff until the back staff reading is taken on the staff held at the last required point.
7. Do the same procedure in the reverse direction and close with the first point

Formulae:

$\sum B.S - \sum F.S = \text{Last RL} - \text{First R}$

Observation:

Reduced level of the first point =

Staff station	B.S	I.S	F.S	H.I	R.L	Remarks

Result:

Closing error =

R.L. for the given points =

Outcome:

Knowing error rectify technique about field measurement values.

Viva- voce

1. What are the types of traverse?
2. What are variation of declinations
3. What is different between magnetic bearing and true bearing?
4. What is plane tabling?
5. Mention the suitability and unsuitability of plane tabling?
6. What is levelling?
7. How leveling is done using foot screws?
8. What is fly levelling?
9. Name the different types of bench marks.
10. What are the different types of leveling staves?
11. What is horizontal equivalent? Why is it constant?
12. What is fore sight?
13. What is back sight?
14. What is change point?
15. What is profile levelling?

Expt. No. 06 LEVELLING - LONGITUDINAL SECTIONING AND CROSS SECTIONING

Aim:

To plot the profile of the longitudinal and cross section for an existing road, embankment, etc

Instruments required:

1. Level with tripod
2. Ranging rods
3. Leveling staff
4. Chain
5. Cross staff
6. Arrows
7. Pegs.

Procedure (Longitudinal sectioning):

1. Fix the centre line by ranging and chaining.
2. Set up the instrument at suitable position and do all the initial adjustments.
3. Place the staff at frequent intervals over the central line (say 5m) and enter the readings correctly.
4. Set the bubble for its centre of run at each and every point.
5. If necessary, shift the instrument to some other place and take B.S as well as F.S. at change points.
6. Do the calibration to find the R.L. for different points.

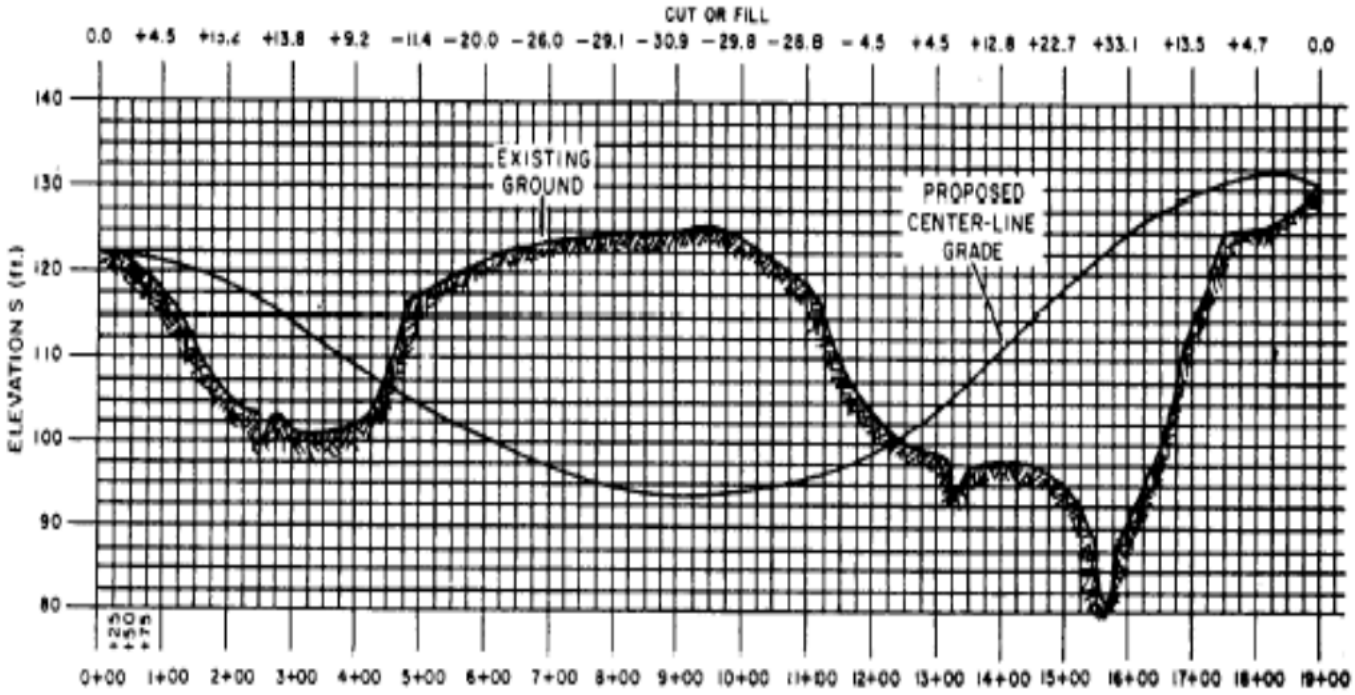
Observation:

Longitudinal sectioning:

Reduced level of the first point =.....

Staff station	Distance	B.S	I.S	F.S	H.I	R.L	Remarks

Graph:



Procedure (Cross sectioning):

1. Align the centre of the bund using ranging and chaining.
2. Fix the longitudinal intervals along the central line depending upon the nature of ground (say 5 or 10m) and let it be C1,C2,C3…….Cn
3. At each longitudinal interval fix cross section intervals perpendicular to the centre line using cross staff or optical square to a suitable distance depending upon the nature of slope of the bund (say 1 to 5m) on each side.
4. Set up the instrument at a suitable position the mostlowest point and most highest point can be focused.
5. Do all the initial adjustments.
6. Turn the telescope and note down the readings as follows
7. The readings along the centre of the bund is recorded as C1,C2,C3……Cn.
8. The readings taken on right side of the centre line is recorded as R1,R2,R3…….Rn and the left side as L1,L2,L3….Ln.
9. Shift the instrument if necessary to some other place. Put change the point and repeat the above procedure.
10. Find the R.L for each and every point by any one of the method.

Observation:

Cross sectioning:

Reduced level of the first point =……..

Staff station	Distance			B.S	I.S	F.S	H.I	R.L	Remarks
	Left	centre	right						

Result:

1. The longitudinal and cross section of the given road is thus plotted.
2. Volume of the earth work estimated = ……

Outcome

Gain the ability to plot the longitudinal and cross section of roads

Viva- voce

1. What is meant by leveling?
2. What is the principle of leveling?
3. What are the types of level?
4. What are the major parts of theodolite?
5. What is Transiting of Telescope?
6. What is face right observations?
7. What is meant by transit?
8. What are the uses of tangential screw provided for the adjustments in a transit theodolite?
9. Write short notes on face left and face right of the theodolite.
10. List out the essential qualities of a theodolite telescope.

Expt.No. 07 PLANE TABLE SURVEYING (RADIATION)

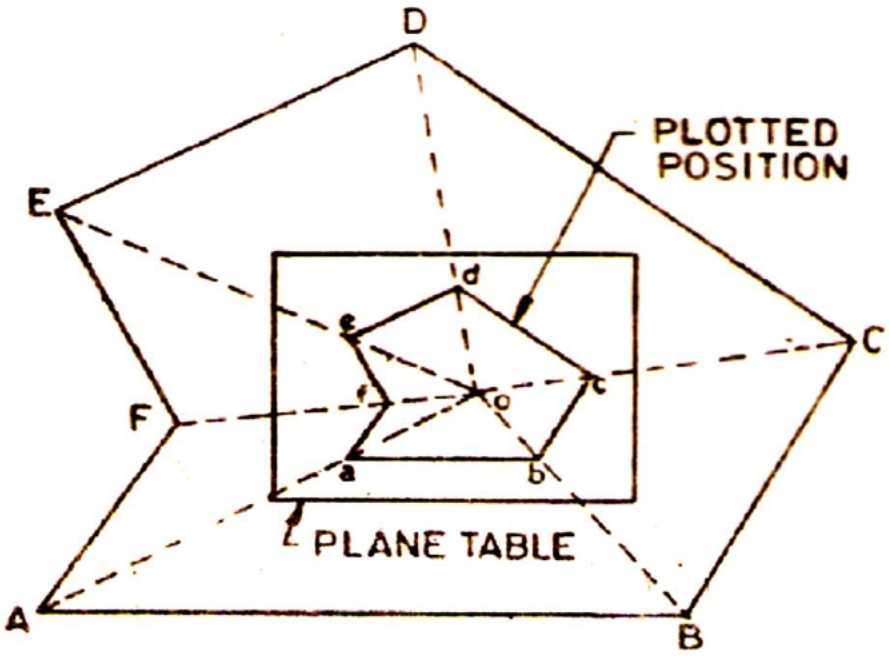
Aim:

To locate the object from a single station and to find the area of the given polygon

Instruments Required:

1. Plane table with stand
2. Tape
3. Trough compass
4. Alidade
5. Spirit level
6. Plumbing fork with plumb bob
7. Arrows
8. Ranging rod and
9. Measuring.

Diagram:



RADIATION METHOD

Theory:

When from a single set of plane table on instrument station different details are located on the sheet, the method is known as radiation method In this method the rays are drawn from the instrument station to the point to be located, then the distances are measured from the instruments station to the point and the position of the each point is plotted on the sheet using a suitable scale.

Procedure:

1. Select the position of the table where it is be set so that all the points to be located are visible from it. Let 'O' be the position of such a point on the ground.
2. Set the plane table over this point and level it. Draw the North line in the top corner of sheet by means of trough compass at the table.
3. Draw the ray along the fiducial edge. Measure the distance of this point from the instrument station by means of tape and plot the point 'a' corresponding to point 'A' in the field to scale in the sheet.
4. Similarly sight other points such as B, C, D, E etc. and measure their distances from the instrument station. Plot them to scale to get their position on the sheet such as b, c, d etc. on the sheet.
5. Now transfer the position of the point 'O' on the ground to the sheet by means of the plumbing fork. The point 'O' will represent point 'o' will represent point 'O'on the ground.

Calculations:

The outline of the profile is plotted as shown = $\sqrt{s(s-a)(s-b)(s-c)}$

S =

Result:

The object from a single station where located and the enclosed area of the given polygon is calculated. Area of the polygon ABCDE =

Outcome:

Understood the field computations and measurement

Viva - voce

1. What are the equipments used in plane tabling?
2. What are the methods of plane tabling?
3. What is leveling?
4. What is the principle of leveling?
5. Mention the types of level.
6. What are vertical controls in setting out works?
7. What are transition curves?
8. Draw a neat sketch showing a simple circular curve and show essential notations.
9. What are the various special conditions confronted in the underground surveys?
10. What is the versed sine of a curved? Express it mathematically.
11. What is mass diagram? Why it is prepared?
12. What is tangent length in a simple curve?
13. What is mid-ordinate in a simple curve?
14. What are the two instruments used for mine surveying
15. How leveling is done using foot screws

Expt. No. 08 PLANE TABLE TRAVERSING

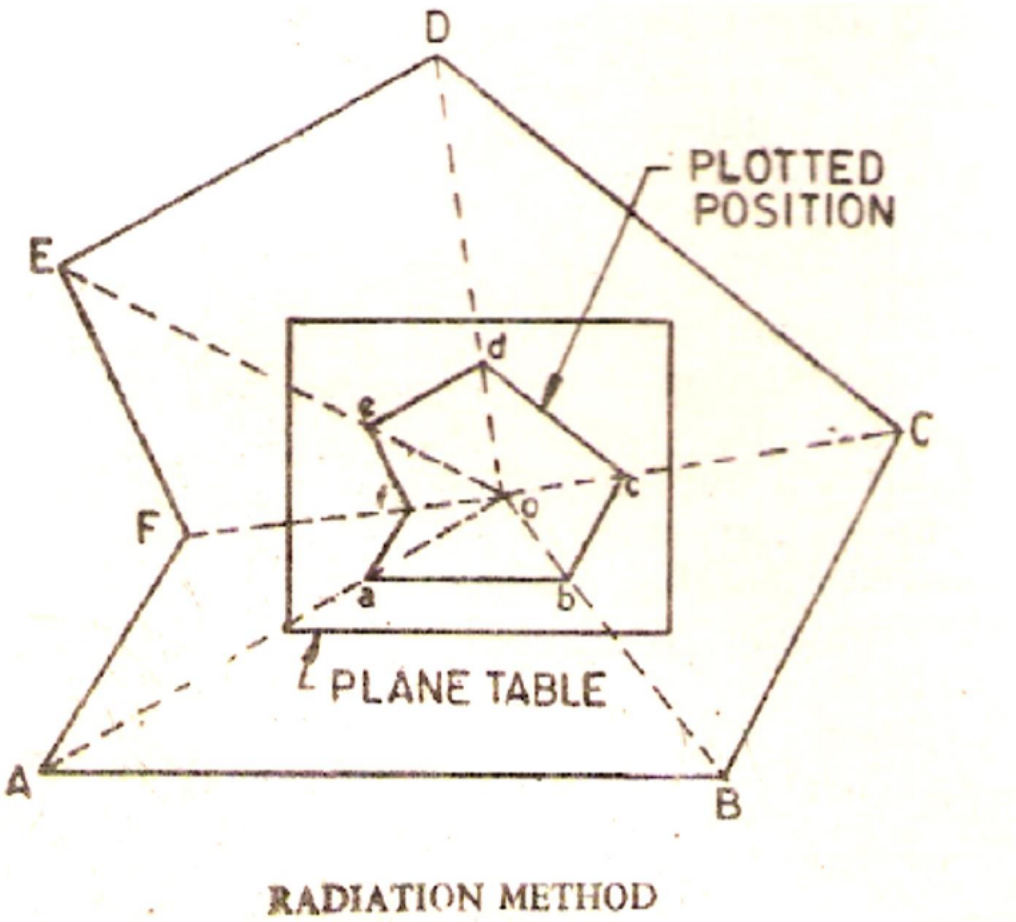
Aim:

To run survey lines between various field objects by traversing

Instruments Required:

1. Plane table with accessories
2. Tape
3. ranging rods

Diagram:



RADIATION METHOD

Procedure:

1. Take A, B, C and D are the traverse station.
2. Set table at station A. A suitable point is selected on the sheet in such a way the whole area may be plotted in the sheet. The table is centered, leveled and clamped. The North line is marked on the right hand top corner of the sheet.
3. With the alidade touching point a, the ranging rod at B is bisected and ray is drawn. The distance AB measured and plotted to any suitable scale.
4. The table is shifted and cantered over B. It is then leveled, orientated by back-sighting and clamped.
5. With the alidade touching point b, the ranging rod at C is bisected and a ray is drawn. The distance BC is measured and plotted to the same scale.
6. The table is shifted and setup at C and the same procedure is repeated for all stations.
7. In this manner, all station of traverse are connected
8. At the end, the finishing point may not coincide with the starting point and there may be some closing error .This error is adjusted graphically by Bowditch's rule.

Result:

The area of the given traverse is = ……..

Outcome:

Knowing position information for property and structure

Viva-voce

1. What are the accessories of plane tabling?
2. Mention the types of leveling staves.
3. What are back sights and fore sights?
4. What is the height of instrument?
5. What is meant by intermediate sight?
6. What are the temporary adjustments of leveling?
7. What are the disadvantages of plane table surveying?
8. Write the advantages of plane table surveying?
9. Differentiate Prismatic compass from Surveyor's compass with reference to reading as well as tripod.
10. What are the errors in a compass instrument?
11. What is true meridian?
12. What is true bearing?
13. What is orientation? Why it is to be performed?
14. What is orientation? Why is it done?
15. What is magnetic meridian?

Expt. No. 09 AREA CALCULATION BY USING TOTAL STATION

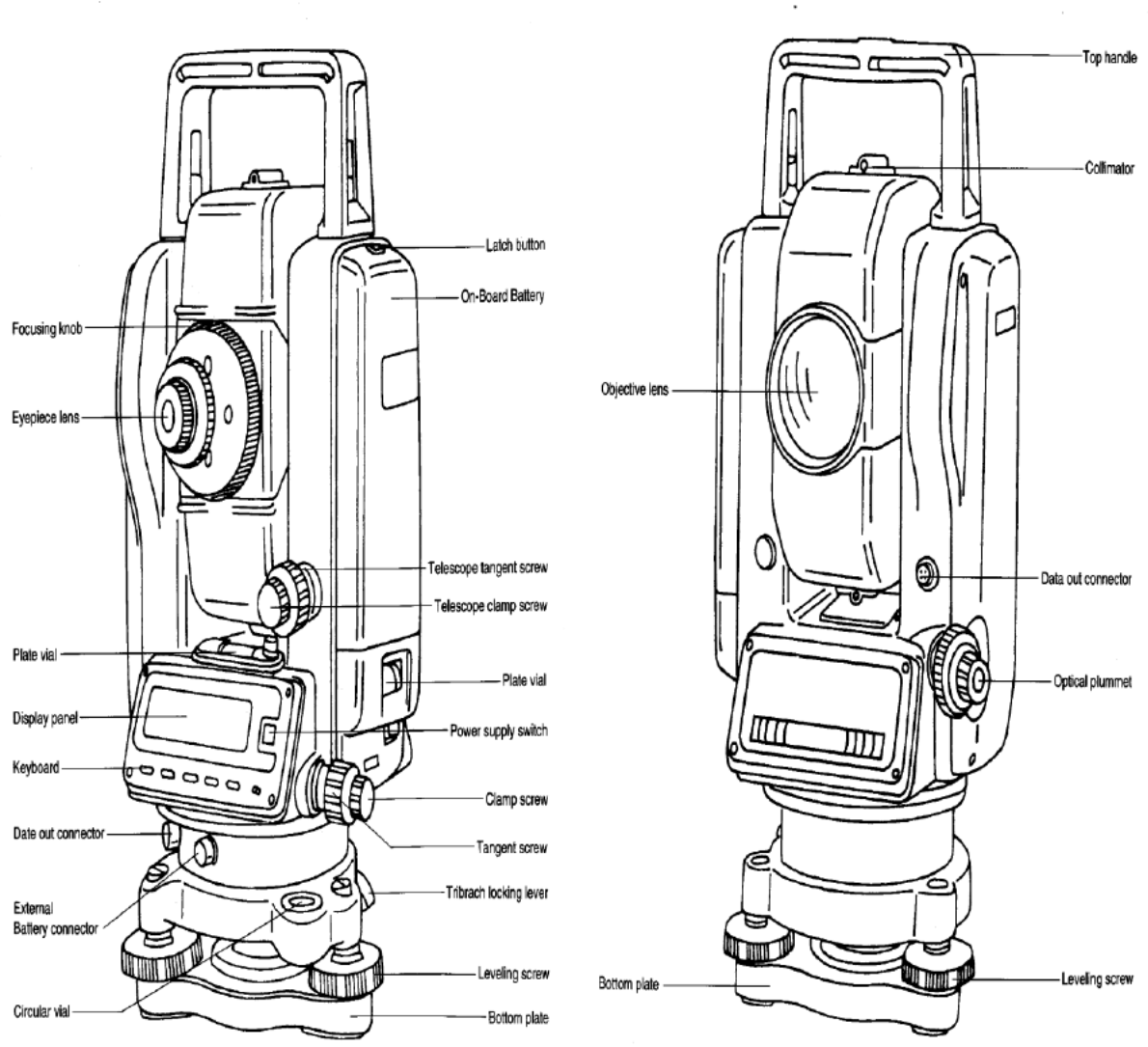
Aim:

Measure the area of given boundary points by using Total Station.

Apparatus Required:

1. Total Station and tripod
2. Prism and prism rod
3. Arrows

Diagram:



Procedure:

1. Set the instrument at the station point which the point covers all boundary points.
2. Do the temporary adjustments in the instrument and level it properly.
3. Set the prism height and enter the prism height value in Total Station.
4. Consider all boundary points in closed traverse.
5. Select the area measurement option and bisect the boundary points with the help of prism.
6. Take readings from all boundary points and directly found the area from Total Station.

Result:

The area of the given field = ---------- measured by Total Station.

Outcome

Gain the ability to use modern survey equipment to measure angle and distance.

Viva- voce

1. What is meant by Contour Gradient?
2. What are the classification of Total station?
3. What are the different methods of contouring?
4. What are LS and CS?
5. What are the parts of total station?
6. What is meant by vertical axis?
7. What is meant by Horizontal axis?
8. What is meant by line of sight / line of collimation?
9. What is meant by axis of level tube?
10. What is meant by centering?
11. What is meant by transiting?
12. What is meant by swinging the telescope?
13. What is meant by telescope normal?
14. What is meant by telescope inverted?
15. What is meant by changing face?